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TEXAS AGRICULTURAL EXPERIMENT STATION

B. YOUNGBLOOD, DIRECTOR

COLLEGE STATION, BRAZOS COUNTY, TEXAS

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DIVISION OF AGRONOMY

ANGLETON GRASS

AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

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†As of June 1, 1926.
*Dean, School of Veterinary Medicine.
**In cooperation with U. S. Department of Agriculture.
***In cooperation with the School of Agriculture.

SYNOPSIS

The Texas Agricultural Experiment Station at Angleton, Texas, is devoting considerable attention to the testing of new grasses and forage crops suited to the Gulf Coastal Plains of Texas. Angleton grass is one of the best grasses that have been introduced, and this Bulletin reports rather fully upon the characteristics, habits, and method of handling the grass, as well as the progress and results of all tests that have been conducted with it.

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BULLETIN No. 342. JUNE, 1926.

ANGLETON GRASS

V. E. HAFNER

Angleton grass was received at Texas Substation No. 3, Angleton, Texas, April 9, 1915, from the Office of Forage-Crop Investigations, United States Department of Agriculture, Washington, D. C. This grass was listed as *Andropogon annulatus* and was grown by the United States Department of Agriculture under S. P. I. No. 34934. The grass is a native of India and was received through the courtesy of Dr. C. V. Piper, then Agrostologist in charge of Forage-Crop Investigations, United States Department of Agriculture. Dr. Piper received this grass as a donation from Mr. W. Burns, Economic Botanist of the Poona Agricultural College, Poona, India. The name "Angleton Grass" was suggested by Dr. Piper during his visit to the Experiment Station, Angleton, Texas, on October 30, 1924, and this name has been adopted.

The shipment from which the introduction was established consisted of only a few plants, which were planted the same day they were received. The size of the plat has been increased each year, so that this station now has a plentiful supply of Angleton grass for distribution.

In India, this grass is known as Marvel grass, also as Jinga grass. ("The Improvement of Natural Grassland in India," by W. Burns, D. Sc., in *The Agricultural Journal of India,* Volume 10, Part III, July, 1915.) It does well there with the excessive amount of rainfall, but requires fairly good drainage. There are in India other grasses that will produce larger yields than this grass, and some that have a higher rating from a chemical standpoint, but this is one of the best known and most highly appreciated wild fodder grasses of the Bombay Presidency, for it is easily propagated, has a good color, and is readily eaten by the stock. When this grass is mixed with other grasses the stock will eat it in preference to the other grasses in the mixture. The grass is of general distribution in India, but very few large areas are found. Seed are produced and the grass is propagated by planting the seed in well prepared seedbeds; however, the germinating quality of the seed is low. Seed are regarded as being difficult to secure in large quantities, as they are harvested by hand.

In India, this grass is usually grazed or is fed green, although it makes a good quality of hay, especially if it is cut during or before the flowering stage. ("The Improvement of Natural Grassland in India," by W. Burns, D. Sc., in *The Agricultural Journal of India,* Volume 10, Part III, July, 1915.) The chemical analyses of the

grass at the Poona Agricultural College have shown it to be very nutritious. The yields have been 8200 pounds to 119,200 pounds of green fodder to the acre.

DESCRIPTION AND CHARACTERISTICS

Angleton grass, *Andropogon annulatus,* is a perennial. It is propagated by runners and rooted plants, and less easily by seed. Propagation by seed, however, has not been attempted at the Experiment Station, Angleton, Texas. Each plant produces a turf which contains 10 to 25 stems. The stems are erect in most cases; however, where the stand is thin, some of these stems become prostrate runners. These runners will take root at the joints that touch the ground, and in this way new plants are formed and a compact sod is secured in a short time. The stems are small and have many slender leaves; so the grass is very easily cured. The stems become fibrous and woody if the grass is not cut before the seed mature. There are a large number of

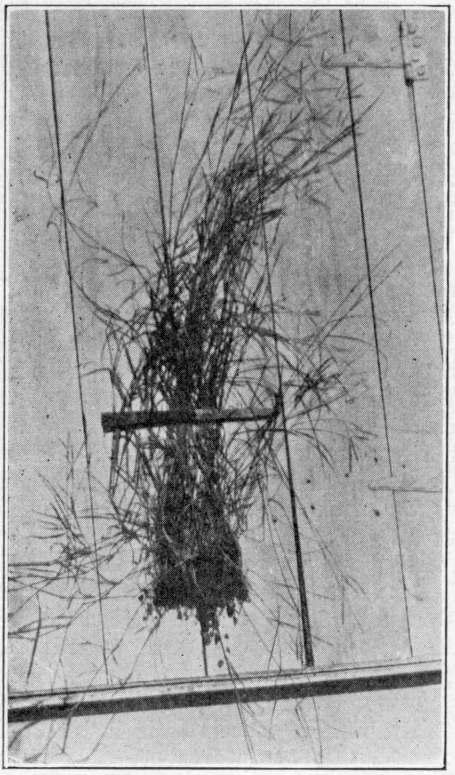

Figure 1. Individual plant of Angleton grass in flowering stage.

fibrous roots, about six inches long, that give this grass a good foothold after it once gets started. Angleton grass does not have rootstocks and for this reason it is not difficult to eradicate.

A dry specimen of this grass was sent to Professor H. Ness, Chief, Division of Botany, Texas Agricultural Experiment Station, College Station, Texas. His botanical description is as follows: "Perennial from a mass of fibrous roots and runners; stems leafy, 3 to 5 feet tall, Figure 1, forming dense tufts, smooth except the purplish colored nodes which are marked by rings of pubescence, especially at the basal border; branches slender, single or in pairs from several of the upper nodes; leaves very smooth, the lower 8 to 10 inches long and about $\frac{1}{4}$ inch broad, the blades of the upper gradually reduced but the sheaths frequently inflated; sheaths of the lower leaves $\frac{3}{4}$ as long as the internodes; ligules smooth, short, firm, truncate, with finely erose margins. The racemes approximate in clusters of three or four on slender hairy, purplish peduncles, varying from $\frac{1}{8}$ to $\frac{1}{2}$ inch in length; spikelets and rachis merely ciliate, not densely hairy; the outer scales in both the sessile perfect flowered spikelets and in the pedicillate neutral spikelets, similar in size, form and color, being about three lines long, oblong-ovate with obtuse erose-dentate apices, somewhat dorsally compressed 7 to 9 nerved and of purplish color; the awn of the perfect floret $\frac{1}{8}$ inch long, closely twisted and bent."

CLIMATIC AND SOIL ADAPTATIONS

Angleton grass is well adapted to the humid part of the Gulf Coastal Plains of Texas and the region bordering this section back to a distance of approximately 175 miles from the coast. It has done well also in other parts of Texas, as will be noted later from trials of the grass reported from other Stations and from private individuals. Its adaptation throughout Texas, however, has not been determined definitely.

At the Angleton Station, Angleton grass has been grown and tested under conditions of extreme drouth and heavy rainfall for over ten years, during which time it has thrived, and is a success. It is one of the best grasses ever introduced into the Gulf Coastal region. The grass has been grown on fairly well drained, heavy dark soil and also on medium heavy soil of the Victoria series at this Station. It has been a success also on sandy loam soils. The grass produces best on well drained soils. It has produced good yields of hay during years of abundant rainfall when the total amount of precipitation was over 60 inches, and in 1924 with a rainfall of 38 inches, which was one of the driest years on record, this grass produced large yields. It has been very noticeable that Angleton grass was green during the dry months, when the native grasses were yellow and apparently dead. In January, 1918, Angleton grass withstood a temperature of 10 degrees F. at this Station without injury.

TRIALS IN VARIOUS PARTS OF TEXAS

Many samples of Angleton grass have been distributed over Texas, especially in the Gulf Coastal region. Favorable reports have been received in a large number of instances. This spring, 1926, there was a steady demand for the grass and the supply was soon exhausted. A farmer near Houston has planted about 12 acres and wants to increase the area to 30 acres as soon as possible. Many other smaller areas have been planted.

In February, 1925, some of the grass was sent to each of eleven of the Texas substations, which are located in different parts of the State, in order to find its possible range of adaptation. At the Experiment Station at Beeville, in Southern Texas, the grass made a good growth, notwithstanding the continued drouth during the summer, and when the fall rains began a dense growth was made. The runners and stems near the ground remained green during the entire winter. Several cattlemen in that section are interested in the grass. A much larger area is being planted to Angleton grass at Beeville.

At the Experiment Station at Beaumont the grass has thrived and is a success on an old rice field that was badly infested with Bermuda grass. A number of farmers are interested in Angleton grass in that section, as they believe it is a most promising grass for that region. The lower stems and runners did not freeze down during the winter.

At Temple, in the black land belt of Texas, Angleton grass made a luxuriant growth, despite the drouth, and reached a height of two and one-half feet. The grass was not injured during the winter.

At Denton some of the plants made a good growth. The grass did not winterkill there.

At Nacogdoches the grass was planted on a red clay soil and reached a height of two feet. It did not winterkill there, and renewed its growth rather early. The good root system that this grass develops should make it a good grass to plant on the hillsides to prevent washing of the land as well as to furnish excellent pasture.

At Chillicothe, Angleton grass grew well under rather trying conditions during the drouth and made a solid mat four feet on each side of the original row. The grass did not winterkill there, and put on new growth in the early spring.

At Lubbock the grass was watered regularly and made good growth. The roots remained alive during the winter. In the spring of 1926 the grass was planted in the pasture for the purpose of testing it under dry-farming conditions in that section.

At Balmorhea, Angleton grass made very good growth when irrigated.

The mild winter of 1925-26 at all of the above Stations was very favorable for the grass and possibly it would not have withstood a severe winter so well. The drouth during the previous summer throughout the State was very trying on the grass. Notwithstanding the drouth, the grass made a good showing. Angleton grass would probably do better under normal conditions of rainfall.

METHODS OF PROPAGATION

Angleton grass can be propagated by planting rooted runners, rooted plants, or by seed. Seed of good germinating quality have not been secured at this Station, so seeds have not been used in propagating the plant here. In India, the grass is propagated by planting seed on well prepared seedbeds.

All of the larger plats at Angleton have been secured by planting the rooted plants and runners of the grass. Each turf from the original plant can be divided into 3 to 25 small rooted plants. When planted, these small plants soon form a large turf and send up erect stems, as well as prostrate runners.

PREPARATION OF THE SEEDBED, PLANTING, AND EARLY STAGES OF GROWTH

Angleton grass should be planted on a well prepared seedbed. The land should be plowed, disked, and harrowed to kill all other grasses and weeds, in order to give the grass a good chance to get started. At the time of planting, shallow furrows should be opened with any suitable implement, such as a lister. The furrows should be 36 to 48 inches apart. Plant one small plant or rooted runner every 12 to 18 inches in the furrow. Cover the plants with a hoe, reversible disk, or disk cultivator, but do not cover too deep. It has been found best to leave a small portion of the stems above the surface. The grass should be cultivated and the middles kept clean until the roots have gained a good foothold and runners start to cover the middles. The many fibrous roots give the grass a good feeding system. These roots penetrate the soil to an average depth of about six inches.

When the grass first begins to grow it has a tendency to spread over the ground. Most of the stems are in the form of prostrate runners. These runners take root at the joints that touch the ground so that new plants are formed, and in this way a compact turf is soon produced. During this stage of growth the stems of the grass are rather coarse. One should not get discouraged with the grass when it is in this stage, for after a good stand is secured almost all of the growth is upright, fine stems with many slender leaves resulting.

VALUE AS A HAY AND PASTURE GRASS

The fine stems and many slender leaves, which are easily cured, make this a good hay grass, especially in the region near the coast where the rainfall is excessive. Here a grass is needed that will cure in a day or two, and Angleton grass answers the purpose satisfactorily.

The greatest objection to this grass is that the stems become woody and fibrous if not cut before the seed mature. The best hay is secured when the grass is cut during or before the flowering stage. According to the chemical analysis of the Poona Agricultural College, Poona,

India, the albuminoids and carbohydrates are highest in the flowering stage. After this stage the woody fiber increases and the albuminoids and carbohydrates decrease.

The hay has a good color. A yield of at least 4 tons to the acre can be expected after the second year, at which time the grass has usually become well established (Figure 2). Two to four cuttings of

Figure 2. Field of Angleton grass in flowering stage, Experiment Station, Angleton, Texas Photographed November 29, 1924.

hay can be secured each year. The yields secured at Angleton are given in Table 1.

Table 1. Yields of Angleton Grass Hay at Substation No. 3, Angleton, Texas.

Year	Pounds of Cured Hay Per Acre
1917	2,760
1919	8,277
1920	7,782
1921	26,890
1923	10,480
1924	13,169
1925	12,936

Samples of Angleton grass hay were sent to Dr. G. S. Fraps, Chief, Division of Chemistry, Texas Agricultural Experiment Station, for a chemical analysis. The results of his analysis are given in Table 2.

Table 2. Chemical Analysis of Angleton Grass.

	Per Cent
Protein	3.49
Fat	1.58
Crude Fiber	39.04
Nitrogen-Free Extract	42.36
Water	6.34
Ash	7.19

Angleton grass also makes a good pasture grass. Stock eat it readily when it is green, and prefer it to the native grasses. This was found true in the grazing tests at Angleton. The grass stays green much longer than the native grasses and the carrying capacity is much higher. In the fall of 1924 it was especially noticeable that the Angleton grass was fresh and green while all native grasses were burned and nearly dead.

One of the best qualities of this grass is its ability to hold its own and choke out other grasses and weeds. It has choked out Bermuda grass and Para grass at the Angleton Station. The plats of Angleton grass are now free of weeds and other grasses.

Angleton grass is easily eradicated if so desired, since it does not have rootstocks. It can be destroyed by one or two shallow plowings at short intervals.

METHOD OF HARVESTING

Angleton grass is cut for hay like any other hay grass. It usually makes a dense growth and for this reason it is more difficult to cut with the mowing machine than the native grasses of the region. If the weather is favorable the grass will cure in 24 to 36 hours after being cut. If the hay cannot be hauled and stored or baled when it is well cured, it should be raked in windrows in order to hold the good color and to prevent burning.

In the fall of 1924 some seed were harvested at the Angleton Station. They were harvested by hand, but this is a slow and expensive process. Some machine should be used to gather the seed. At this Station two cuttings of hay can be secured and there will be ample time for a crop of seed to mature if frost does not occur before the average date of killing frost, which is November 25.

SUMMARY AND CONCLUSIONS

Angleton grass is one of the best grasses that have been introduced into the Gulf Coastal Plains of Texas. It is a success in this region and should be used extensively by maymakers and cattlemen. It is readily propagated from tufts. It yields a heavy tonnage and cures quickly. It has a deep fibrous root system and easily competes with all other vegetation; yet it has no rootstocks and is easy to eradicate.

Angleton grass may be propagated from seed, and this is the customary practice in India, but at Angleton the seed tested have not germinated well, although a large number of samples have not been tested.

Angleton grass is well adapted to the humid part of the Gulf Coastal Plains of Texas. Field trials with the grass at the Experiment Stations at Beeville, Temple, and Denton also indicate that the grass is adapted to those parts of the State having 30 inches or more of rainfall. Angleton grass has succeeded on soils that vary from sandy loam to heavy clay.